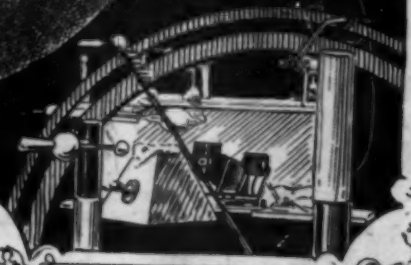
Vol. XIII. No. 4. October, 1903.

THE AMERICAN X-RAY JOURNAL

A MONTHLY DEVOTED TO THE PRACTICAL APPLICATION OF THE NEW SCIENCE AND TO THE PHYSICAL IMPROVEMENT OF MAN.



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THE AMERICAN X-RAY JOURNAL

PUBLISHED MONTHLY BY THE AMERICAN X-RAY PUBLISHING COMPANY.
55 State St., Masonic Temple 1207, Chicago, Ill.
Editor, T. PROCTOR HALL, A. M., Ph. D., M. D.
Managing Editor, H. PRESTON PRATT, M. D.

SUBSCRIPTION RATES—IN ADVANCE:

United States, Canada and Mexico.....$3.00 | Foreign Countries.....$4.00
Single Copies..... 50 | Single Copies..... 60

Contributions of Original articles and other matter relative to X-Radiance and Electrotherapy, of interest to the medical profession, are solicited from all parts of the world. Contributors will be furnished extra copies of the JOURNAL containing their articles at cost of publication.

Entered as Second-Class Matter, March 4, 1903, at the Postoffice at Chicago, Ill., under the Act of Congress of March 3, 1879.

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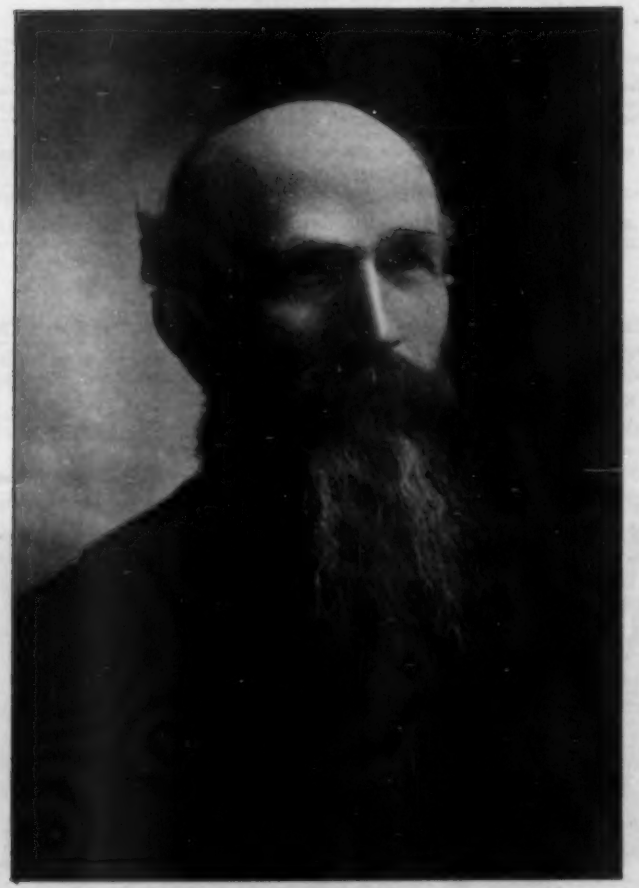

DR. W. K. HARRISON,
Vice-President American Electro-Medical Society.

THE AMERICAN
X-RAY JOURNAL.
Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. XIII. CHICAGO, OCTOBER, 1903. No. 4

Electro-Therapy.

A Course of Twenty-four Lessons under the auspices of the Chicago College of X-Ray and Electro-Therapeutics

LESSON 5 - SIMPLE APPLICATIONS OF ELECTROLYSIS.

Electrolysis is brought about by one of the electrodes which is placed directly in contact with the part to be treated. The other electrode is made larger and is placed on any convenient part of the body. Around the kathode (negative electrode) alkalis are formed which, when present in small quantities, soften the surrounding tissues and induce hyperemia, which results in increased nutrition in that region. When a strong current is used so that the alkalis are present in larger quantities the tissues immediately surrounding the kathode are partially dissolved and their protoplasmic material destroyed. If the surrounding tissues are vascular the use of a slight current causes a mild inflammation which soon subsides. Either a slight hyperplasia or a perfectly normal condition results. With a stronger current the effect at the kathode is to induce a greater amount of inflammation and to dissolve a certain amount of the tissue. As the inflammation subsides the part which has been destroyed is usually absorbed and the tissues in that region shrink gradually.

Around the anode are formed acids which have an astringent effect upon the tissues. These act upon the nerves and blood vessels, reducing the caliber of the latter and diminishing the blood supply to that region. With a stronger current the albuminoids around the anode are coagulated, and the parts thus hardened may remain for a long time in the form of scar tissue, which may be gradually absorbed. If a very large amount of tissue were destroyed in this way necrosis might result. It is evident that the amount of the current, or rather the current density, in any particular spot decides whether we are going to have there a modification of the nutritive process or destructive effects. Destruction may be brot about by the use of either the anode or the kathode, and the operator must use his judgment under the different conditions as to which should be used.

Apparatus.

The apparatus required is simple and not expensive. It may be purchased ready-made from any dealer in electro-medical supplies, or the elements may be purchased and the apparatus constructed by any one having a little mechanical ingenuity and a few tools. A battery is the best source of current for minor operations in electrolysis. Some arrangement is needed by which as many cells as are necessary may be thrown into the circuit one at a time. The ordinary Leclanche cells are efficient and cheap. Some forms of dry cells are still cheaper and more convenient. The electro-motive force of each Leclanche cell is about 1.6 volt when new; when old it is about 1 volt. The e. m. f. of the ordinary dry cell is nearly the same.

Ten cells in good working order are sufficient for minor work. If very large currents are required, as in the destruction of malignant tumors, the operator will require a large battery of fifty or sixty cells, or a direct current from the incandescent circuit whose voltage is usually 100 to 120.

In addition to the battery there are required some flat electrodes which may be made of sheet copper or zinc and which should vary in size from 6x8 centimeters to 15x20. Some flexible conductors (silk covered) are required for making connections with the battery. It is convenient to have two colors so that there will be no confusion between the positive and negative electrodes. The needle holder should be small and round, and light in weight. There is no advantage in having a circuit breaker on it. Unless your sight is perfect it will be necessary to have a small eyeglass or magnifying glass. A watchmaker's eyeglass answers the purpose admirably. Urethral and other electrodes which are required for special work will be described later.

Extraction of Hairs.

For this an electro-motive force of from four to ten volts is required. The lower voltage is used for smaller hairs, and the larger for large, coarse hairs in the less sensitive parts of the skin. It is not satisfactory to use say fifty volts, and to cut down the current by means of a rheostat, because the sensation produced by the current is roughly proportional to the voltage as well as to the current, and a small current with a high electro-motive force may be intensely painful, while the same current with a lower electro-motive force causes very little pain.

A steel needle may be used in all cases of electrolysis in which the needle is made the kathode, but if a steel needle is made the anode the tissues will be blackened. It is better in all cases to use a platinum needle, which should be not more than three cm. long. The needle must be very fine near the tip, not coarser than the hair which is to be extracted, and the tip should be olive shaped. If the point is too sharp there is danger of failing to follow the hair follicle down to the root of the hair, or of pushing it beyond the root.

When ready for operation connect the cells of your battery in series (carbon of one to zinc of the next), connect the electrodes, and test the circuit by taking one electrode in your moistened fingers and touching the other to the tip of your tongue. A slight sting will be felt if the current is passing. If there is no current, clean all the connections, tighten them up and try again. When the battery is in working order have the patient sit or lie in a position convenient for operation. Cleanse the surface to be operated upon with a little alcohol or ether, connect your needle holder with the negative (zinc) pole of the battery, and give the patient the positive electrode to hold in his hand, instructing him to hold it very lightly at first. (Some operators insert the wire from the positive pole into a glass of water, into which the patient puts one or more fingers to complete the circuit.) Now place your needle holder parallel to the direction of the hairs, insert the needle gently beside the hair and instruct the patient to grasp the electrode more firmly. The needle will glide gently down to the root of the hair and there will meet with slightly increased resistance. Cease pressure upon it and wait for from ten to thirty seconds until small white bubbles (of hydrogen) appear around the needle. Ask the patient to release his hold upon the electrode, withdraw the needle, and pull gently upon the hair with a small pair of forceps. If the bulb has been properly destroyed the hair is extracted with scarcely any force, minus its bulb. If force is required in the ex-

traction the electrolytic action has not been sufficient. Insert the needle again and allow the current to pass a little longer. After a little experimenting you will know how long to leave the needle before attempting extraction. The hairs vary greatly in depth, from one mm. to six or eight. If the current is started before the needle is inserted the insertion is likely to be painful. If there is much pain when the current is turned on (by the patient grasping the electrode firmly) it is probable that the needle has been pushed beyond the follicle and the current is acting upon the surrounding tissue instead of upon the hair to be removed. In that case remove the needle and do not make a second attempt to extract that hair at that sitting. If the needle is left too long, so that there is an excessive amount of electrolysis, there is some danger of producing a minute scar or pit. This danger is much increased if a number of hairs lying near together are extracted at one sitting. It is not safe to extract hairs that are as close together as the hair follicles are deep in the skin. The proper procedure is to go over the ground leaving intervals of three or four mm. and go over the same ground again in the same way at the next sitting. Twenty to fifty hairs will usually be found to be enuf work for one sitting. If the extraction is properly done the slight inflammation produced subsides in one or at most two days. No further work should be done in that region until the inflammation has subsided completely. When the operation is completed cleanse the skin again with alcohol or some mild antiseptic solution, and apply a zinc ointment. A milliampere meter is not necessary. If one is used it will be found that the necessary amount of current varies from one to five milliamperes. It is a good rule in all cases to begin with a very small amount of current, say two or three cells, and gradually increase if this should not be found sufficient.

Moles, Warts, Etc.

In the treatment of all elevated abnormal growths of the skin the platinum needle is by far the best method. If the elevation (say a mole) is soft, insert a sharp pointed needle about one mm. from the edge and on a level with the skin. Then start the current in the same way as before and push gently on the needle until it has passed clear thru the mole. If the point on emerging is too deep or not deep enuf withdraw it partly and try again. When the mole is thus transfixed lift gently upon the needle so as to form a slight neck upon the edge of the mole. Now let the current pass for one or two minutes until the part of the mole around the needle becomes a dead white in appearance. Stop the current, withdraw the needle, insert it again parallel to its original position and two or three millimeters distant. Repeat this process until the mole is completely killed. After five or six days examine again to see whether there are any parts still remaining and requiring further treatment. When removed in this way no scar is left. No scar is left in any case of electrolysis in which not more than the superficial layer of the skin has been destroyed.

If the abnormality is very hard and firm the needle must be inserted slightly below the level of the skin and the insertions must be made closer together. It is not advisable to insert the needle radially, for then there is danger of the center of the wart receiving much more treatment than the edges, in which case the result might be a slightly elevated margin with a depressed center. The negative electrode is used exclusively for these growths.

Birthmarks, or Nevus.

Birthmarks are caused by relaxation of arteries, veins or capillaries, and the object of electrolytic treatment is to occlude these vessels so as to cause their absorption. The positive electrode forms a firm coherent clot in the blood vessel. It is therefore useful for obstructing the larger vessels when they are present. The platinum needle is inserted into or thru the blood vessel and the current turned on until the vessel is occluded. The needle is then connected with the kathode for a few seconds until it is parted from the clot and can be withdrawn without difficulty. In occluding veins care must be taken not to withdraw the needle until the clot is firmly fixed, otherwise the clot may become an embolus and cause any amount of mischief. In occluding smaller veins and arteries the needle is connected with the negative pole and the current passed until the blanching extends for several mm. around the needle. In treating birthmarks begin with the larger blood vessels involved, or if these are invisible begin at one side and be guided by experience as to the amount of current required to contract the vessels. Birthmarks may be treated with an anode needle insulated with shellac to within one cm. of the tip which is inserted under the skin before the current is turned on.

Fissures and Sinuses.

Nearly all cases of chronic inflammation require some stimulating application to increase the blood supply and bring about healing. In some cases it is also necessary to use an antiseptic to destroy pathogenic germs. Fissures are readily treated with a silver probe, used as a kathode to lightly cauterize the raw surface of the fissure with three to ten ma. current. Frequently a single treatment is sufficient for a cure. The same treatment may be applied to a sinus, using preferably a copper wire insulated except one cm. at the tip, treating successive portions of the sinus from within outward at different sittings. In some cases it is preferable to use a bare copper wire, treating the whole sinus at one time, making the wire the anode, until the surrounding tissues are stained green or blue with the dissolved copper. The wire is then connected with the kathode for a few seconds until it is free from adhesions and is easily withdrawn.

Strictures.

Cicatricial strictures of the esophagus, urethra and rectum are readily relieved by the use of an olive pointed sound which is insulated except near the tip and made the kathode. The sound should be about two sizes larger than will pass the stricture. The current is turned on when the sound is pressing lightly against the stricture. No force is used. Not more than six ma. is used for the urethra and not more than twenty for the esophagus or the rectum. A meter is necessary. There should be no pain whatever during the operation. The sound, acting as a kathode, causes relaxation and softening of the scar tissue of the stricture, and the slight inflammation produced is sufficient to induce absorption. The operation is repeated in five or six days with a slightly larger sound, and this treatment is continued as long as any stricture remains. When the work is properly done there is no recurrence. The technic of this operation has been very fully described by Dr. Robert Newman (AMERICAN X-RAY JOURNAL, October, 1902).

Pustules, Boils and Carbuncles.

These are the result of local infection which frequently takes place thru the hair follicles. They may be aborted in the early stages by the use of the epilating needle. In more advanced stages also the needle may be inserted and passed gradually to the center of infection after

the current is turned on. Leave the current on long enuf to sterilize this region. The needle must in all cases be made the kathode. In acne pustulata each pustulate must be treated in this way. With an antiseptic wash to prevent re-infection, two or three treatments are frequently all that is necessary for cure.

A Plea for Accurate and Scientific Application of the Roentgen Rays in the Treatment of Diseases.

BY MIHRAN K. KASSABIAN, M. D.,
DIRECTOR OF THE ROENTGEN RAY LABORATORY, PHILADELPHIA, PA.

(Abstract of a paper read in Atlantic City before the American Electro-Therapeutic Association.)

Among new therapeutic agents the Roentgen rays are pre-eminent in bringing about cures which had seldom been effected by other agents. After the discovery of these rays scientific men began to investigate their therapeutic powers. The results were so satisfactory as to cause much commotion among the members of the medical profession, some of whom appeared to approve and others condemn the new method. Since that time x-ray therapeutics has steadily advanced. It is now regarded as the most satisfactory agent in the cure of malignant diseases, lupus vulgaris, and other dermatological abnormalities which resist other treatment. The true value of the x-ray in therapeutics has not yet been fathomed. It has wrot many cures and has stimulated many members of our profession to make extensive researches along the line of the application of the newer forms of force.

In such investigations it is of the highest importance to make accurate records of the application of this agent. In the Roentgen ray department of the Philadelphia Hospital I have had printed a record book compiled according to the needs from a careful study of two or three years; and from its use I am now convinced that it is as nearly correct as possible and fulfills the needs in all respects. This book is for recording a thousand cases, and consists of two parts, one for a complete history of the patient and the second for details of the style of apparatus used, its manipulation and the results of the x-ray treatments. By carefully keeping such a record and noting in it the various points concerning the respective cases undergoing treatment, I am of the opinion that we shall soon be able to arrive at a correct form of treatment which will bring about a cure in almost every instance. This information can only be supplied by carefully noting in the record book all the necessary details observed from time to time. I would suggest the taking of one photograph of the diseased area before treatment and another after the cure has been effected. The photograph should be life size. The plate for the negative should be isochromatic in order that the color value of the tissue may be recorded, or instead of employing such a sensitive plate a color filter may be used answering the same purpose. Previous to the exposure of the plate the seat of lesion must be thoroly cleaned of any ointment that may have been placed thereon, also of its discharge if any be present. The comparison or after photograph should

be produced in identically the same way as the "before-photograph" in all respects, and should be of the same size and density, to make the comparison of the two of value.

Today each of the various x-ray therapeutists thruout this country and abroad employs his own technic in treating the different diseases. It stands to reason that those who obtain no results or perhaps only partial results must employ a faulty technic.

It is important, therefore, that we each should record fully and give to the profession at large his technic in detail, along with the results obtained. Then each may learn from the other and the technic of all be improved.

The results of treatments depend upon the patient's general health, the nature of the disease, the location of the disease process, the length of time the treatment is continued, and lastly upon the correctness of the technic employed. I can not see that the patient's idiosyncracy has anything to do with the bringing about of good results or otherwise. To my mind a uniform, correct technic does more to bring about good results than anything else.

The color of the x-ray tube has no influence on the intensity and quality of rays produced. Crookes tubes made of borax glass fluoresce blue; those of Luringen glass, a greenish yellow hue. The temperature of the antikathode and the thickness of its platinum disk has no direct effect on the quality or quantity of rays. The kind of rays produced by the tube depends mainly upon the degree of vacuum. A low vacuum tube gives forth a greater number of rays, which have less penetrating power but stronger physiologic or therapeutic effect, and gives a well contrasted image in the fluoroscope. Keinbrok has classified tubes as follows:

a. Too hard (no light, no x-ray).

b. Hard (light, producing a bright image on the screen with but slight contrast).

c. Medium (well contracted image on the fluorescent screen).

d. Soft (large quantity of x-rays slightly penetrative).

e. Too soft (no x-rays, electric energy is converted into heat).

The distance of the tube from the screen must be stated in explaining the appearance of the image.

The dosage in treatment is estimated by means of two instruments, the radio chromometer and the spintometer. The first consists of a transparent scale of layers of aluminum, increasing in thickness. The steps of the scale are compared with a thin silver plate, from which conclusions are drawn as to penetrability of the rays. The spintometer, arranged parallel to the Crookes tube, measures the length of the spark, from which is inferred the resistance of the tube.

The Holzknecht chromoradiometer consists of a fluorescent salt whose tint is compared with a standard color scale. This instrument is not very delicate.

The method used by Freund and Schiff, namely to measure the current and voltage in the primary of the induction coil used, is condemned by some authorities, but I claim that it is far more scientific than any other method thus far advanced. The number of current or ray impulses per second depends upon the type of interrupter employed, and the total amount of radiation produced in a given time is dependent upon its rate. In the absence of definite and scientific methods of measuring the x-ray I suggest that in each case the operator should specify the size of coil, source of current, type of interrupter, number of breaks per minute, primary current when producing the full spark, spark length at this speed of in-

terruption, primary current registered during exposure, duration of exposure, parallel spark length of the tube, distance between patient and anti-kathode of tube. In employing static machines state the type, number of plates, number of revolutions per minute and length of spark produced during exposure, diameter of the plates, character of the tube, as well as the history of the patient.

The whole practice of x-ray therapeutics is at the present moment in its infancy; patient work and tabulation of working conditions and results by each member of this Association will widen its sphere of usefulness.

American Electro-Medical Society.

First Annual Meeting, Masonic Temple, Chicago, December 1, 2, 3, 1903.

Outline Program.

Monday, November 30: 2 p. m., meeting of Executive Council.

Tuesday, December 1: 2-5 p. m., papers and discussion.

Wednesday, December, 2: 9 a. m., business session.

Wednesday, December 2: 9:20 a. m.-1 p. m., papers and discussion.

Wednesday, December 2: 2 p. m., business session of Illinois State Society.

Wednesday, December 2: 3 p. m., Executive Council meeting.

Thursday, December 3: 9 a. m.-1 p. m., papers and discussion.

Thursday, December 3: 2 p. m., demonstrations and clinics.

Physicians and others attending the meetings of the society may purchase tickets for the International Live Stock Exposition, which will be held in Chicago November 28 to December 5, and for which round trip tickets will be sold for single fare plus two dollars ($2.00) from points as far east as Buffalo and Pittsburg.

Papers will be presented by Dr. John B. Murphy, Chicago; Dr. G. Betton Massey, Philadelphia; Dr. Byron Robinson, Chicago; Dr. J. Mount Bleyer, New York; Dr. C. S. Neiswanger, Chicago; Hon. John M. Smulski, city attorney for Chicago; Dr. J. Rudis-Jicinsky, Cedar Rapids, Iowa; Dr. H. Preston Pratt, Chicago; Hon. Edward B. Elliott, city electrician for Chicago; Dr. Clarence E. Skinner, New Haven, Conn.; Dr. J. N. Scott, Kansas City, Mo.; Dr. R. S. Gregg, Chicago; Dr. Mihran K. Kassabian, Philadelphia; Dr. T. Proctor Hall, Chicago; Dr. A. D. Rockwell, New York; Dr. Carl Beck, New York; Dr. Heber Robarts, St. Louis, Mo.; Dr. J. B. Pennington, Chicago; Dr. John E. Gilman, Chicago; Dr. Chas G. Davis, Chicago; Dr. P. C. Clemensen, Chicago; Dr. J. P. Hetherington, Logansport, Ind.; Dr. O. W. McMichael, Chicago; Dr. O. S. Barnum, Los Angeles, Cal.; Dr. Elmore S. Pettyjohn, Chicago; Dr. Geo. F. Hawley, Chicago; Dr. John E. Harper, Chicago; Dr. J. Lloyd Hammond, Chicago; Dr. F. A. Leusman, Chicago; Dr. C. D. Collins, Chicago; Dr. Hamilton Forline, Chicago; Dr. R. H. Bartlett, Chicago; Dr. H. P. Fitzpatrick, Chicago.

In connection with the meeting there will be an exhibit of electro-therapeutical apparatus.

Some Therapeutic Uses of the X-Ray.

BY W. P. SPRING, M. D., MINNEAPOLIS.

(Continued from page 282.)

mary improved but stopped treatment; three, primary, no result except pain stopped. Coley[12] reports one case of cervix cured; three cases, no benefit. J. Rudis-Jicinski[13] reports primary cancer of cervix cured in four months.

SUMMARY.

In cases in or about the uterus, the reports show no results in seven cases, seven cases improved, four cured symptomatically, nine dead. Here, also, we must wait for future reports.

CANCER OF THE BREAST.

Pfahler[9] reports one recurrent on left side, and primary on the right side, and glands in both axillæ, and both practically cured in six months. Second, primary, five exposures, nearly cured, and patient died of uremia. Third, recurrent in both breasts and no results. Three cases of recurrent improving. C. W. Allen[10] reports six recurrent cases and three primary. Of these, one died, three stopped treatment and five are under treatment and improving. H. P. Moseley[11] reports one primary, inoperable, ulcerating; died. Two, recurrent; nodules improved but patient died of metastasis. Three, case much improved. J. Rudis-Jicinsky[13] reports case of ulcer of right breast with gland in axilla; treated four weeks, then operated, then treated nine weeks; no recurrence as yet. Grubbe[14], first, three recurrences of small nodules, four months' treatment and practically cured; second, recurrence of nodules, cured in five months; third, primary, ulcerated, cured in three months; fourth, primary scirrhus, cured in five months. J. P. Lord[15] reports, first, the fourth recurrence and patient died of metastasis with cure of local disease; second, scirrhus, no results; third, recurrent in scar and axilla, cured. Hopkins[16], first, primary, cured in three months; two, recurrent cured with x-ray and Finsen light. Skinner[3] reports one case of recurrence, ulcerated, with temporary arrest, and pain stopped, patient died; second, scirrhus and glands, discharge stopped and symptoms better; third, primary, ulceration and glands, ulcer cured and patient much better; fourth, primary, one-half gone; fifth, recurrent, nearly cured; sixth, primary, improved. H. R. Varney[4] reports thirteen cases of breast, all recurrent but one; three inoperable; three cured with the rays alone; two with the rays and knife; five partial cures; and three, no results. J. F. Winfield[27] reports six cases, two primary and four recurrent; first, primary, stopped growing after four exposures; two with three exposures; two with three exposures and one-half smaller. Of the recurrent, one died after a few treatments and then operated on, no recurrence as yet. Pusey[6] reports one recurrent cure in five months; second, recurrent, cured in three months; third, recurrent, cured in two months; three cases with no results. Coley[12] reports twenty-one cases; in three cases the nodules were gone in a few weeks, but recurred. The x-ray did not prevent recurrence in two cases that were treated right after operation. Dr. Morton, in a very valuable paper which will be found in the *Medical Record* of May 30, 1903, and which everyone should read, reports a series of twelve breast cases, as follows: First, breast case, tumor, primary, cured with seventy-four treatments, six months; second, breast ulcerated, nearly cured in ninety-three treatments, seven months; third, primary, scirrhus, size of a goose

egg, with glands, after forty-six treatments, very nearly gone; fourth, primary, reduced from six inches to two inches, perfectly movable, then operated; fifth, cure of primary breast cancer and lymphatics, nine treatments; sixth, cure of tumor, ten weeks, thirty-three treatments; seventh, tumor cured from November 18 to January; eighth, tumor cured from December to April; ninth, scirrhus, very much better after four months; tenth, recurrent on one side, primary on the other; cured symptomatically five months, sixty-five treatments; eleventh, recurrent nodule, cured in seven treatments, twenty-four days; twelfth, recurrent, breast and axilla cured from August 27 to December 28.

SUMMARY: CANCER OF THE BREAST.

Four stopped treatment, then died; five nearly cured; twenty-three cured; eleven, no results; seventeen improved; eleven cured with use of x-ray and knife. It seems to me that Dr. Morton, in his last paper, to which I have just referred, has made a step in advance that will give us better results in deep cancers. In the future we should not hear so much of operators who do not produce a burn, and it will be better understood that the man who is afraid to crowd the treatment, even though he sometimes produces a burn, is the man who is getting poor results and is perhaps stimulating growth instead of destroying it. The x-ray dosage is similar to any powerful drug. Small doses produce stimulation and growth; larger doses, destruction of abnormal tissues; and still larger, of tissues of low vitality, such as the hair and nails; and if still further crowded, any tissue can be destroyed.

Through the kindness of some of the prominent operators throughout the country, I am permitted to read to you a few of their experiences and their opinions of the results in deep cancer.

CORRESPONDENCE.

Dr. Margaret Cleaves, of New York, writes: I have had only the most desperate of inoperable cases that have been a forlorn hope from the beginning. From my experience with them, I believe that in all inoperable cases the x-ray should be used; second, that by its use, pain and hemorrhage are controlled, discharge lessened, odor modified or controlled entirely, fistulous openings sometimes healed, and the utter loathsomeness of the disease done away with; third, in the cases that improve, nutrition is markedly improved and functions likewise; fourth, for those cases absolutely without hope, x-ray treatment makes the last days of the patients much more tolerable to themselves and to others than would otherwise be possible; fifth, if perchance a case improves, that improvement is only to be maintained by remaining, so to speak, in an x-ray and ultraviolet environment—in other words, in touch with x-ray treatment. As to curing those cases, I am absolutely without hope, in the present state of our knowledge; sixth, I believe the treatment worth while, no matter how desperate the case.

We have much to learn about the x-ray, and the best method of using it. With greater knowledge we may do more and better.

Were a member of my family suffering from an inoperable cancer, I would use the x-ray, no matter how far advanced the case.

Dr. Russell H. Boggs, of Pittsburg, Pa., writes: In deep carcinoma I have had some results, every case has shown improvement, and some more than others, but each sufficient to show that each case of carcinoma, no matter where located or how hopeless the outlook, should be treated by the x-ray.

The greatest drawback to the treatment, and this would apply more particularly

to deep-seated carcinomas, is that physicians and friends of the patient are continually discouraging them by saying that it is useless to attempt treatment of such cases by the x-ray. * * * * * As an illustration: Mrs. A., aged thirty-eight, had the uterus and appendages removed a year and a half ago, for carcinoma, which recurred six months afterward. Two of our best gynecologists were called and both pronounced the case inoperable on account of the large mass and number of adhesions. The x-ray treatment consisted of ten minutes every day for ten weeks, with a medium low tube, but with sufficient spark gap to give penetration. At the end of this time the tumor was reduced one-half and all discharge checked. Then some friends and a friendly physician said that there was nothing in x-ray treatment. They kept discouraging the patient, and she stopped treatment.

Dr. William J. Morton, of New York, writes: I should be very happy to write you a few special words, but it will be utterly impossible just at present. But my opinion is fully expressed in an article by me in the *New York Medical Record* of May 30, 1903. The article is entitled "Primary and Mammary Carcinoma Treated by the X-Ray." I think you will see in reading those cases that I believe that mammary carcinoma, although internal, can be successfully treated by the x-ray .

Dr. Robert Newman, of New York, writes: My observation is that the x-rays do better in cancer than any other treatment. In all cases, even in far advanced ones, it will arrest all pains; next, it will lessen and finally arrest the suppuration; then it may clear the ground of the suppurative field, changing it to a healthy appearance, filling up the wound with good granulations, diminishing the sore, and, in many cases, healing up and covering it with a new cutaneous surface. This process takes place in favorable cases, if they present themselves early, when the disease is local, but if the cases are advanced or operations have taken place, the chances for complete recovery lessen. However, in far advanced, unfavorable cases, much good will follow the treatment by the x-ray, as always it will alleviate pain, and procure thereby rest and sleep, which makes the patient comfortable even to a fatal end. Under all circumstances, the x-ray ought to be used, as doing a great deal of good and allaying many painful and unpleasant symptoms.

Dr. William B. Coley, of New York, says: I have used the x-ray in about one hundred cases of malignant disease, and my present opinion of its value does not differ materially from that already expressed in the paper I sent you. I am more and more convinced that in order to obtain permanent success, one must continue the treatment, not only for weeks and months, but for years. I have one patient with inoperable sarcoma of the femur, whom I have been treating with the x-rays since a year ago in February. The original disease seems to have been destroyed and the metastatic growths in the pectoral and lumbar regions are now slowly yielding to the combined x-ray and toxin treatment. My most satisfactory results in sarcoma have been obtained in cases where the toxins were used in combination with the x-ray. I am strongly opposed to the x-ray in any but inoperable growths.

Dr. Clarence E. Skinner, of New Haven, Conn., writes: I have not changed my views since I read my paper at Chicago last December. Of course, we do not get the same quick and satisfactory results in deep cancers as in superficial cancers, but it has been proved, not only by my own experience, but by that of half a dozen other men, that cancer, the most deeply seated, is curable by the

x-ray in a certain proportion of cases, and it is imperative that the agent be given a trial in all cases. This is the only way we can find out which will respond and which will not. There is nothing else that will do any good, and, as I have said, this will do some of them good.

The men who are constantly reporting failures are the ones who are using the coil and low tube. Those who are successful are using the static machine and high tube.

Do not be discouraged because you have failed in a few cases, but keep it up, doctor, thoroughly and accurately, and you will some time accomplish a cure that will astonish you.

Dr. G. W. G. Hopkins, of Brooklyn, writes: I am still using the x-ray in treatment of all forms of cancer with increasing satisfaction. In uterine cancer I am having excellent results in combination with the Finsen light.

Dr. G. E. Pfahler, of Philadelphia, writes: In answer to your inquiry concerning the use of the x-ray in deep cancers, I believe that it is still in the experimental stage, and that no accurate or positive conclusions should yet be drawn. That it is of value is proven by the cases that have been cured. In nearly every instance they were inoperable, either because of the extent of the growth, its location, the condition of the patient, or the absolute refusal of operation by the patient. It surely means just that many lives saved. That it is not a sure cure is proven by our failures. Besides the usual anemia present in advanced cases, we almost always have to deal with a septicemia resulting from the degeneration of the cancer as a result of the treatment. As to the permanency, we dare not yet say.

As a whole I believe it is a good thing, and that it should be recommended in all cases where operation is contra-indicated or refused, and should follow all operations for malignant growths. I am supported in this view by the fact that I have two cases of recurrent carcinoma, involving both breasts and the axillary regions, which I believe are well; also two cases of advanced and inoperable carcinoma of the uterus which are apparently cured, besides a number of other cases still improving under treatment.

Dr. M. F. Wheatland, of Newport, R. I., says: I would say that my case of cancer of the stomach (reported in the AMERICAN X-RAY JOURNAL for March), in which the surgeon thought it was necessary to perform pylorectomy, has not had any treatment since January, and is today apparently in excellent health. The case of cancer of the breast died of cardiac asthma. A recent case of cancer (male, age 70) starting in epulis about the right molar and extending to the cheek and soft palate, involving the lymphatic glands on that side, and producing great distortion of the face and neck; after a few treatments the mass softened, and an opening was made at the angle of the jaw and pus evacuated. In the course of two months the wound healed, and, to external appearance, became normal. Treatments are now particularly directed to the condition of the soft palate, which does not improve very rapidly, owing to the timidity of the old gentleman and the inability to properly direct treatment to that part. He has, however, gained ten pounds in the last two months. * * *

My favorable results warrant me in believing that with the amount of work being done at this time, there will be evolved a technique capable in the future of influencing for good the larger number of cases.

Dr. C. W. Allen, of New York, writes: I believe that the ray is capable of doing valuable work in deep-seated breast can-

cer. Till now results are not brilliant; still, life may be prolonged, and an occasional cure of an otherwise hopeless case may be effected, which is something. Great care must be exercised or fatal termination will be hastened.

J. Rudis-Jicinsky writes: In superficial cases of malignant growths, though the recurrence is possible, radiotherapy should, as a rule, be tried first, especially in epithelioma, rodent ulcer, etc.; in carcinoma of the breast, operate and use the rays both. In deep-seated carcinoma surgery should be the first resort. Evidence not sufficient yet in regard to rays; open to doubt. My results were negative. In some cases slight reaction, but death followed; in others, auto-intoxication manifested variously by fever, diarrhea, and general symptoms of sepsis. In inoperable cases, ray always, and control the pain at least. In glandular sarcoma, operate and use the x-ray also. In inoperable cases the rays may be worth trying. Influence upon pain marvelous in some cases; in superficial cases, as far as yet, no recurrence in my cases, and I had very many. In tubercular glands x-ray may be tried. We get some results, but if there is not an invasion of the lungs, we may get recurrence in about six months. In tubercular joints the results are good. In lupus there is no doubt as to favorable action of the raying. In tubercular laryngitis, we use the ray as a prophylactic measure only. In all chronic skin disease, where epilation is desired, we get satisfactory results, especially if we use the Finsen light too.

The pain is controlled in nearly all cases soon, due, perhaps, to the high tension, and not the ray alone.

Dr. G. G. Burdick, Chicago, Ill., writes: In reply to your letter will state briefly that in tuberculosis I am getting very satisfactory results, probably averaging 70 per cent symptomatic cures. Of course I do not depend upon the ray alone. For internal cancer the ray treatment is very promising, but not conclusive. I have had a large number that are symptomatically well, and have been for many months. To say they are cured would be rather premature.

My good results are increasing as my knowledge of the ray increases, and we expect in the near future to have better equipment for handling internal diseases.

Dr. G. B. Massey, of Philadelphia, writes: I must express my continued astonishment that the profession is so ready to investigate x-rays in cancer while so slow in taking up massive cataphoresis of mercury and zinc. I can demonstrate any day that the latter should supersede the knife almost entirely in operable cases, and that it is often preferable in inoperable cases. While speaking positively in this way, I do not mean to under-rate the value of the x-ray as a last resort in many inoperable cases and in very extensive surface infections, malignant and otherwise, in which the best results have been obtained with the rays. I regard the minor zinc-mercury method under cocaine as generally better because it is not only easier of application, but absolutely free from the risk of burns that still attend radiation.

Of the value of the x-ray in strictly internal growths, I have had no experience, but have been called upon to use cataphoresis in case of cancer of the mouth, vagina and rectum, after they had failed to be of benefit.

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Radio-Therapy.

Bactericidal Action of the Radium Rays.

R. Pfeiffer and E. Freidberger (*Berliner klinische Wochenschrift*, July 11, 1903) experimented with typhoid and cholera bacilli in cultures, which were killed or markedly inhibited when exposed to radium at one cm. distance for forty-eight hours.

Histological Changes in Epithelioma Under X-Rays.

Dr. J. Clark Stewart (*Journal A. M. A.*, July 18, 1903) made careful examination of epithelioma of the wrist giving micro photographs. He found fatty degeneration marked in all the sections. In the earliest slides many new blood vessels were seen, which are at first filled with red blood cells but later are packed with polymorphonuclear leucocytes. In some of the earliest slides mitosis is well marked but later is rarely seen. The nuclei undergo gradual destruction and there is at the same time fusion of the cell bodies and loss of cell outline as in coagulation necrosis. The final form resembles sterile pus.

These results are quite different from those obtained by Ellis.

In discussion Dr. H. A. Christian, of Boston, reported a case in which a portion of a carcinomatous growth was protected from the x-ray by a lead shield, and in this part none of the degenerative changes which appeared in the exposed part were found. No polymorphonuclear leucocytes were found in this case.

Carcinoma of the Breast.

Mikulicz and Fitting (*Beitr. Z. Klin. Chir.*, B. 37, H. 3) reports a case in which the lymphatics of both axillæ were first removed, then the cancer treated by x-rays. After four weeks the microscope showed no cancer particles in the tissues. The mass was ulcerated to begin with.

X-Ray in Pulmonary Diseases.

Dally (*Lancet*, June 27, 1903) finds that unilateral limitation of the motion of the diaphragm is the earliest indication of pulmonary tuberculosis. At a later stage the lung may appear mottled. Consolidation throws a shadow of moderate density. Caseation gives a dark shadow. Cavities are transradiant, but if full of pus they may not be noticeable. Acute

dry pleurisy cast no shadow. A purulent effusion casts a darker shadow than a serofibrinous effusion. Emphysema is indicated by brightness. Pneumonia by a light shadow which becomes denser. Pulmonary gangrene gives a well defined opacity. Bronchitis can not be diagnosticated by x-rays.

Cases Cured by X-Ray.

Dr. W. J. Morton, of New York, in the *Medical Record*, July 25, 1903, gives illustrations and report of sixteen cases, including facial cancer, carbuncle, keloid, acne, alopecia areata, sychosis, fibroid tumor, psoriasis and lupus. Most of these have been almost or entirely cured. One case of epithelioma of the cheek improved for some time then steadily extended in spite of anything that could be done with the x-ray and violet ray. This was a deep epithelioma with everted edges and pearly nests. This patient is now improving under caustic treatment.

A carbuncle softened under one treatment of eight minutes, and all pain was relieved.

A fibroid tumor of the uterus after thirty-nine treatments is reduced at least one-third in size and a symptomatic cure is obtained.

The best results with lupus were obtained by giving strong treatment until severe dermatitis was produced on the adjacent normal skin. Treatment was then stopped and the lupus healed by itself in two or three weeks.

X-Ray Tissue Changes.—A study of cases by Ellis shows: 1. Necrosis of cells and trabeculæ of varying degree, and in one also marked fatty degeneration. 2. Increase of elastic tissue in the three cases examined, both before and after exposure. 3. Fewer areas of lymphocytic infiltration in one case after exposure, about equal numbers in others. 4. A tendency to occlusion of vessels by deposits on their inner surfaces, marked in some instances, not so prominent in others. 5. Practically entire absence of infiltration by polymorphonuclear leucocytes. While these results do not warrant conclusions, especially as further studies are being made as regards the nerve and blood changes, he offers the following suggestions:

1. Beck and others lay great stress on blood vessel changes as the cause of necrosis. While endarteritis is probably induced by the x-ray, the accompanying tissue necrosis seems out of proportion to the vessel changes, suggesting the possibility of these being *pari passu* results of the same influence, instead of cause and effect.

2. The presence of immense numbers of cocci and bacilli in the tissues of Case 3, after twenty exposures to the x-ray, would argue against the possession by that agent of bactericidal power. It should be said that the pathogenicity of these micro-organisms was not proven.

3. The unsatisfactory clinical results as well as the slight microscopic changes in Case 3, can probably be safely attributed to the presence of the exceedingly numerout keratinized areas or pearls. This emphasizes the importance of curetting or cutting away diseased tissue, whenever feasible, before instituting treatment by the x-ray.—*Jour. A. M. A.* February 7, 1903.

Radio-Therapy in Colitis.

Tousey (*New York Medical Journal*, July 11), uses the x-ray for chronic conditions with mucous and bloody discharges which have not yielded to intestinal antiseptics. He uses also the high frequency current from a vacuum electrode in contact with the abdomen. His cases under treatment show improvement.

Therapeutic Value of the X-Ray.

Dr. W. F. Campbell, Brooklyn, N. Y., in the *International Journal of Surgery*, October, 1903, reports two cases of lupus cured and one improving; tuberculosis of the lips, cured; cervical adenitis, much improved; carcinoma of the breast, two cases, recurrent, nearly cured; epithelioma of face, three cases, much improved; carcinoma of rectum, inoperable, general improvement but no diminution in the size of the growth; tuberculosis of the tarsus, nearly cured.

Recurrent Sarcoma Cured by X-Rays.

Dr. F. M. Jeffries (*Denver Med. Times*, July, 1903) reports a spindle-cell sarcoma in front of the right eye of a canary bird cured in five months' treatment.

X-Rays in the Treatment of Malignant Growths.

Dr. Marcus F. Carsom, Griffin, Ga., in the *Atlanta Record of Medicine* for July, finds x-rays of great value and reports four cases. The action of the x-ray is three-fold: first stimulating, second alterative, and third destructive, and it must be applied with judgment.

X-Ray and its Relation to Malignant Diseases.

Dr. J. Ritchey Horner, of Cleveland, Ohio (*Cleveland Med. and Surg. Reporter*, July, 1903) says the x-ray "has been used for its therapeutic properties only during the past two years or perhaps a little more. During the first half decade of its use it was utilized entirely for diagnostic purposes." We presume Dr. Horner refers to Cleveland only, as the x-rays have been used for therapeutic purposes since April, 1896, in Chicago, and in many other places nearly as long. He states also of the x-ray "in sarcomatous growths nothing very definite has been accomplished." Exactly the reverse is true. The author is evidently little versed in the literature of x-rays.

X-Ray Treatment of Acne.

Dr. H. R. Slack, La Grange, Ga. (*Atlanta Journal-Record*, July) reports four cases cured with only slight hyperemia and pigmentation of the skin. He reports also cures in three epitheliomas and three carcinomas of the breast, two of them inoperable; and two cases of tuberculosis.

Cure of Lupus Erythematosis.

Dr. W. S. Gottheil, of New York, in *International Journal of Surgery*, October, 1903, reports four cases. Treatments were given for ten to twenty minutes three times a week. After from nine to twenty-two treatments three of the cases were cured. The fourth case was of sixteen years' standing and had had severe treatments of various kinds. There was much cicatricial tissue, and x-rays produced very slight improvement.

Reports upon Radiotherapy.

Dr. Martin F. Engman (*Inter-State Medical Journal*, July, 1903) reports (1) a cure of epithelioma of the tongue about the size of a dime by exposures with a moderately hard tube at a distance of three to six inches given every other day for twelve days, then after a week's interval, daily. The exposures were at first five minutes, later ten and finally fifteen minutes. The abnormal tissues after two weeks sluffed off and the burn quickly healed. There has been no recurrence for a year.

Dr. Engman attributed his success to the fact that treatments were begun early and the lesion was easily accessible. An-

other factor in the treatment which is worthy of note is its severity. Treatment of cancer of the tongue has been in most cases a failure due probably to the radiotherapist being afraid to induce strong reaction.

(2) Hyperidrosis of both axillae was treated in a similar way except that exposures were stopped as soon as itching or redness appeared. After three months' treatment an improvement of fifty to seventy per cent was found, which appears to be permanent.

(3) A dressing which Dr. Engman has found serviceable for itching and burns of minor degree produced by x-rays is applied on absorbent gauze, laid over the surface and covered with a sheet of gutta-percha.

The following is the composition:

℞	Acidi borici	ʒxii
	Zinci oxidi	
	Amyli	
	Bismuth subnit	*aa* ʒi
	Ol. olivæ	ʒi
	Liq. calcis	ʒiii
	Lanolini	ʒiii
	Aquæ Rosæ	ʒxii

M.

The powder should be well rubbed up in a mortar and the lanoline added. The olive oil and liq. calcis are well mixed, then this mixture slowly added to the powder and lanoline, constantly stirring. When this is thoroughly mixed the rose water is added and the whole beaten up in the mortar into a light creamy paste. If there is much pruritus, 1 per cent or 2 per cent of Calvert's carbolic acid can be added to the whole.

Observations in X-Ray Work.

Dr. G. P. Edwards, of Nashville, Tenn., summarizes the results of his last three years' work in x-ray therapy as follows:

Nineteen cases of eczema, fourteen cured; one vesicular eczema of hands and feet under treatment, not improved. Two of chronic eczema rubra senilis, failed. One of eczema intertrigo, failed. One of so-called tuberculous eczema of nurslings, failed.

Three cases of tinea barbæ—all cured.

Two cases of tinea circinata—cured.

One case of tinea versicolor—cured.

One case of lichen ruber—cured.

Five cases of psoriasis—three cured.

Sixteen cases of acne vulgaris—fifteen cured—one quit.

Four cases of seborrhea oleosa—all cured.

Three cases of hyperhidrosis of hands and feet—two cured and one quit.

One case of keratosis pilaris—cured.

Three cases of keloid—all cured.

Eight cases of lupus vulgaris—seven cured, one quit almost well.

Four cases of lupus erythematosus—three cured, one quit.

Twenty cases of carcinoma cutis—sixteen cured, four quit.

Five cases of cancer of the lip—one cured, three quit, and one under treatment, unimproved. One case of cancer of the tongue failed.

Three cases of cancer of the breast—one cured, one failure and one under treatment.

Four cases of cancer of the uterus, two cured, one failed and one under treatment.

Treatment of Cancer by X-Ray.

The International Journal of Surgery for October, 1903, is devoted to electro and radio therapeutics. The first paper on treatment of cancer is by W. J. Morton, of New York. He advises early x-ray treatment in every case, and before and after surgical operations. For cancer of the breast in the early stages he considers x-ray treatment more likely to be successful than surgery. For rodent ulcers he claims 100 per cent cures with

the x-rays. Ulcerated cancers are more difficult to handle than those in which the skin remains unbroken. Open ulcers are liable to infection during treatment, and should be covered with a layer of absorption cotton. In deep seated carcinomas treatment may be carried on until there is severe dermatitis of the overlying skin, but if the skin is involved in carcinoma or sarcoma lying directly beneath it severe dermatitis is dangerous, often causing rapid extension of the disease. Dr. Martin favors the view that mild leucocytosis is established by x-ray treatment and is the principal factor in recovery. He has found no difference between daily treatments of short duration and three or four times weekly with longer duration. By giving as nearly as possible the same intensity of treatment at the same distance he has never been surprised with an unexpected burn. He uses no shield except for the hair and eyes, believing that the surrounding regions should have the benefit of the x-rays, since one can never say how extensive a cancer infiltration has become. Dr. Morton describes also his combination of quinin with the x-ray, and some experiments with radium in the treatment of cancer.

Dangers of the X-Ray.

Recent widespread publications of Mr. Edison's experiences with the x-ray and similar contributions are calculated to bring the public mind into a state of uncertainty concerning the dangers of this valuable therapeutic modality. We can not believe that this will affect its employment in the hands of recognized authorities. It will act as a timely warning, however, against the employment of the x-ray by charlatans and those of limited experience in its use, and thereby induce a more favorable impression by preventing the accidents which must occur in the hands of those who do not understand it and by leading those who are not familiar with its actions to investigate more thoroly before they undertake its employment. With these two classes of operators there is a danger which the public should appreciate. In the hands, however, of the skilled physician who both knows how to take care of himself and patient there need be no concern as to unfavorable results from the use of the Roentgen ray.—*Advanced Therapeutics.*

Sunshine and Fresh Air in the Treatment of Tuberculosis of Bones and Joints—Dr. De Forest Willard, of Philadelphia, said that all these new agents which had sprung into prominence within the last few years could as yet be regarded only in the light of therapeutic assistance to the classic treatment of tuberculosis by rest and extension. He believed that all hospitals should be fitted with commodious solaria where the patients should be exposed in a condition of virtual nudity to the direct rays of the sun. It might be well to cover the affected parts with blue glass so as better to permit the passage of the actinic rays. Inasmuch as air was as necessary as light, open air life was as much indicated for these patients with tuberculosis of the hard parts as for those whose soft tissues were involved. He concluded that the actinic and the x-rays were at best only supplemental assistants to the mechanical and general therapeutic measures usually employed.—*Jour. A. M. A.*, July 18, 1903.

Electro-Therapy.

Struck by Lightning.

Four men were struck. One was killed, two slightly injured, and the fourth rendered unconscious. There was a wound on the back of his head around which the hair was burned off, and two scratches on the right thigh. He soon revived, with intense pain on the left side, which was relieved by morphia. Hot baths and a liquid diet resulted in perfect restoration in one month.—*Lyon Medical*, June, 1903.

Extraction of a Foreign Body from Bladder with a Magnet.

An iron peg, five cm. long by six mm. wide, was inserted in the urethra by a young man and slipped into his bladder, where it could be seen by radioscopy. It was extracted by means of a Hirschberg portable magnet, the short tip used in ophthalmology being replaced by a long one, shaped something like a catheter.—*Beitraege, Klin. z. Chir., Tubingen.*

Static Electricity for Women and Children.

Dr. M. G. M'Ginnis (*Med. Brief*, August, 1903) considers static electricity peculiarly suited to women and children because it has "no chemical or electrical properties," meaning, we suppose, that these properties are less prominent than some others. He says oxidation is promoted, nutrition improved and the excretion of urea and uric acid hastened. Some general instructions are then given for treatment and seven cases are reported.

A Simple Method of Producing Anesthesia.

A very simple method for producing local anesthesia, and one that will commend itself in the performance of minor operations, has recently been described by a writer in the *Lancet*. The method outlined is as follows: A solution consisting of adrenalin chloride two drachms, cocain five grains, and water one-half ounce is prepared. Lint is folded into a pad of four layers, soaked in the solution, and placed under a positive electrode. A large negative electrode is applied elsewhere, and a current of from fifteen to thirty milliamperes is slowly induced and run for the space of from five to fifteen minutes. The surface may then be washed with ether, and superficial operations performed painlessly and without loss of blood.—*Medical Age.*

Value of the Static Machine as a Therapeutic Agent.

Dr. H. M. Chapman, of St. Louis (*Courier of Medicine*), says the static machine gives a potential of 500,000 volts or more, and gives not a standing charge but an electric current. The first physiological effects are deeper respiration and a marked tendency to perspire. There is increase in the pulse rate, arterial tension and temperature. Elimination of urea is increased. Digestion is accelerated and the appetite is improved. The breeze and the spray act upon the vaso motor nerves, contracting the capillaries and reducing the temperature of the skin. Large quantities of ozone are developed. The percussive spark induces muscular contraction and contraction of the capillaries at the point of discharge, which is followed in a few minutes by dilatation. These sparks relieve chronic pain and stiffened joints, and causes the absorption of old exudations. There is no more suggestive therapeutics about static electricity when properly handled than there is about any reputable treatment of medicine or surgery.

Ocular Injuries Due to Electricity. (*Le Progres Medical,* December 6, 1902).—In the past two years Terrien has observed forty-five cases of ocular injury of electrical origin, all of which were due to an electrical discharge—short circuit—in the immediate vicinity of the victim. Cases are classified as (1) benign, (2) moderately severe, (3) severe.

Symptoms.—Redness and swelling of the skin, or, in severer cases, a superficial burn of the skin with singeing of eyelashes and eyebrows. Conjunctival hyperemia is constantly present. Circumcorneal injection, chemosis and edema of the lids are rare. Within a few days a scanty mucopurulent secretion appears which consists microscopically of fibrin enmeshing leucocytes and epithelium. In about one-third of the cases a transient ciliary injection denotes hyperemia of the iris and uveal tract. Ophthalmoscopically the retina is hazy, the papilla and large vessels are blurred. The writer has never observed lenticular changes. The patient complains of itching, prickling and a sensation as if a foreign body were beneath the lid.

Factional Disturbances.—Immediately following the injury there is an intense dazzling, which is succeeded in a few minutes by an equally transient erythropsia. Central vision is always impaired and the field is contracted. Fixation is difficult or impossible on account of the quivering of objects. In severe cases the foggy vision may be due to a true central scotoma. This difficulty of fixation and the contraction of the visual field are the last two symptoms to disappear.

Nervous Disturbances.—An early symptom is photophobia. Later, headache of a neuralgic character, pain in and around the eyeballs and a sensation as if a band were compressing the head. Pain is evoked by pressure on the globe, on the ciliary region and at the points of emergence of the supra and infraorbital nerves. The severity of the pain thus evoked is directly proportional to the intensity of the trouble. There is occasional hyperesthesia of the skin and conjunctiva.

Motor Disturbances.—There is usually blepharospasm and occasionally a true contraction of the orbicularis palpebrarum which may persist several months. As a rule pupillary reaction is normal. If the pupils contract and immediately dilate under continued light stimulation, or if the pupils are dilated and do not react to light, the prognosis should be guarded.

Secretory Disturbances.—Secretion of tears is often excessive and is increased on exposure to light. Some cases exhibit lachrymal crises.

The ophthalmoscopic findings, diminished visual acuity, and consistently contracted field (as determined by repeated observations), taken in conjunction with the symptom group, will exclude malingerers. It is sometimes very difficult to differentiate the immediate effects of the accident from neurotic conditions resulting remotely therefrom. From the medico-legal standpoint this matters little, as the physician need concern himself only with the degree of incapacity for work. Recurrent hyperemia of the conjunctiva, marked and persistent photophobia, inverse action of the pupil, widely dilated pupils, severe neuralgic pain with pain on pressure on the globe and on the points of emergence of the supra and infraorbital nerves, are of grave prognostic import.

Thiosinamin and Electrolysis in the Treatment of Tubal Obstruction.—Dr. J. C. Beck, Chicago, after treating fourteen cases, concludes that without mechanical treatment the injections of thiosinamin do not materially improve the condition; but, after use in conjunction with electrolysis, a simple bougie could

be passed with greater ease and inflation was more free and all the cases treated improved in all respects, as regards hearing, tinnitus aurium, general condition, etc. He also says that before using thiosinamin careful inquiry should be made for possible contra-indications to its use, such as existing chronic tuberculosis, malignant tumors and scars which support the abdominal organs in the abdominal wall, such as are found after laparotomy. The drug may be used with just as good results —tho it is not as rapid in its action— by mouth administration as hypodermically.—*Jour. A. M. A.*

The Bactericidal Properties of the Blood.—Halliburton, in his remarks before the British Association for the Advancement of Science, said: "The power of the blood to destroy bacteria was first discovered when an effort was made to grow various kinds of bacteria in it; the blood was believed to be a suitable soil for this purpose, but it was found to have the opposite effect in many instances. The chemical characters of the substances which kill the bacteria are not fully known. Evidence appears to favor the leucocytes as the origin of this bactericidal substance. These substances are called alexins, but the more usual name now applied to them is that of bacteriolysins. The bactericidal power of the blood is closely related to its alkalinity. Increase of alkalinity means increase of bactericidal power. Alkalinity is probably beneficial, because it favors those oxidative processes in the cells of the body which are so essential for the maintenance of healthy life. Normal blood possesses a certain amount of substances which are inimical to the life of bacteria. When a person gets run down, there is a diminution in the bactericidal power of his blood. However, a perfectly healthy person has not an unlimited supply of bacterio-lysin, and if the bacteria are sufficiently numerous he will fall a victim to the disease which they produce. In the struggle he will form more and more bacterio-lysin, and if he gets well it means that the bacteria are vanquished, and his blood remains rich in the particular bacterio-lysin he has produced, and so will render him immune to further attacks from that particular species of bacterium. Every bacterium seems to cause the development of a specific bacterio-lysin. Immunity can more conveniently be produced gradually in animals, and this applies, not only to the bacteria, but also to the toxins they form."—*Internat. Med. Mag.*, May, 1903.

Chicago Electro-Medical Society.

The next regular meeting will be held at 1208 Masonic Temple on Tuesday, Oct. 27, at 8 p. m. Several papers will be presented.

Electro-Diagnosis.

Os Trigonum Detected by X-Rays.

H. P. Mosly found what was at first supposed to be a fracture of the astragalus but which proved to be an os trigonum, an abnormal tarsal bone described by Berdeleben in 1883 (*Annals of Surgery*).

How to Secure the Best Skiagrams.

Dr. W. M. Brickner (*International Journal of Surgery*, October, 1903) says the most important point is in the management of the vacuum tubes. Penetration and definition are quite different properties, and the penetration is not al-

together dependent upon the degree of vacuum. Generally, high vacuum means poor definition. Low vacuum means dark shadows and clear outlines. For skiagrams a low vacuum should always be employed, and the length of exposure is varied to allow for difference in density.

Tubes with a good focus upon the antikathode should be reserved for skiagraphy. Radio-therapy does not require a good definition. A number of points are given for judging the vacuum of a tube and for changing it. Nothing is said about the use of lead screens.

Operations under X-Rays.

VANCOUVER, B. C., Oct. 5, 1903.

Dear Doctor—During the past month I have had two interesting cases, in which the x-ray did signal service. It might be of interest to the readers of your journal to have them reported therein.

The first was that of a little girl four years old, who swallowed a twenty-five cent piece, twenty-four hours before being brought to my office. The x-ray was applied and coin was clearly discernible lying in the œsophagus in front of the first dorsal vertebra. Chloroform was given and a long curved forceps introduced into the throat. The forceps would not reach within a half-inch of the coin, altho pressed in with considerable force. The anesthetic was diminished when the presence of the forceps caused the child to gag, bringing the coin up within reach, when it was easily grasped and removed.

The second case was that of a boy twelve years old who was shot in the back of the neck with a twenty-two caliber rifle. The ball entered the neck two inches behind and one inch below the lobe of the right ear, passing under the skull and lodging in the upper part of the mantle at the junction of hard palate and alveolar process. The bullet was located by the aid of x-rays and removed thru the mouth. No damage was done beyond a slight fracture of the hard palate and the boy is making good recovery. Yours fraternally, ROBERT TELFORD, M. D.

St. Barnabas Hospital, of Minneapolis, is putting in a complete electrical outfit, with a coil for x-ray work. Dr. W. P. Spring has been appointed consultant in electro-therapeutics, and will have general charge of this department.

We regret to learn that Dr. Maurice F. Pilgrim, of New York City, died of pneumonia on Sunday, October 18.

Electro-Physics.

Experiments on the Loss of Weight of Radium.

Experiments were conducted by Prof. Dorn to settle the question as to the loss of weight sustained by radium in the course of time. As determined by Heydweiller, there is an appreciable loss even in comparatively short time. His results are directly contradictory of what had been found by Becquerel. Dorn operated on about thirty grams of very active radium bromid and his results do not agree with those of Heydweiller, in as much as he finds that the loss is certainly not more than 0.001 mgm. in three months and perhaps not that much. The radio-activity of the substance used by Dorn was at least ten times greater than that of Heydweiller.—*Phys. Zeit.*, July 1.

Devonport Tram Cars.

The line is very hilly and the grades as high as one in ten. Each car is now provided with two Brush motors. In going down hill the motors are thrown into operation and the energy of the car, instead of being wasted in the brakes, is converted into electric currents, giving a regeneration current of forty to fifty amperes. Brakes are not used except to hold the car still on the grade. The saving of energy is about 30 per cent, and the maximum demand on the line is reduced from one hundred and forty am. to eighty am. per car.—*London Electrical Review*, July 24, 1902.

Rotation of Liquids Under the Action of a Magnetic Field.

A contribution of Prof. Nernst to the discussion repeatedly mentioned in the *Digest*, between the author and Prof. Drude, as to whether a magnetic field could produce rotation in an electrolyte. The author referred the question to Nernst, and the latter now finds that the rotation actually takes place under the right condition of experiment. The sense of rotation of the liquid is reversed, when the magnetic field is commuted.—*Urbasch in Zeitsch. f. Electrochem.*, June 25.

The Nerst Lamp.

This lamp is now coming into actual service. Instead of the carbon filament of the ordinary incandescent lamp there is a "glower" which is a short strip made of a mixture of oxides of magnesium, yttrium, zirconium, thorium and cerium. This glower at ordinary temperatures is a non-conductor, but at a high temperature is a fairly good conductor. Being noncombustible it is not necessary to inclose it in a vacuum. Each glower is about one inch in length and one mm. in diameter. Several glowers are placed in parallel side by side. The first is heated by a coil of fine platinum wire, which is thrown out of the circuit by an armature as soon as the glower becomes a conductor. The first glower heats the next, and so on. The glower deteriorates rapidly on a direct circuit because of electrolytic action. With an alternating current the only deterioration is that resulting from the intense heat. The life of a glower is from four to eight hundred hours.

Lamps are made with one, two, three, six or thirty glowers, giving an illumination of from twenty-five to 2,000 candle power and requiring from one and one-half to two watts per candle power.—*Electricity*, July 31, 1903.

Radium Rays.

London (*Berliner Klinische Wochenschrift*) used thirty mgms. of radium bromid inclosed in a box. He found that a piece of sealing wax which has been electrified by rubbing with flannel has its discharge scattered by being passed over the radium box.

Some mice were placed in glass cages. On top of one of the cages the radium box was placed. On the third day the mice in this box became sick. The box was then removed but the mice died on the fourth and fifth days. The first indications of sickness were redness of the ears, blinking, sleepiness, loss of appetite, muscular irritability. Then followed hard breathing, coma and death.

The sensitiveness to light of some partially blind persons was very much increased when the radium box was placed near their eyes.

Radiation from Caoutchouc.

Van Aubel recently showed that after caoutchouc has been exposed to dry ozone for some minutes it acts upon selenium like a feeble illuminant, causing its resist-

ance to fall seven per cent in fifteen minutes. This is simply another illustration of the existence of the unnoticed radiations which exist everywhere.

Radioactive Gas from Metallic Mercury.

Strutt gives the results of a series of experiments from which he draws the following conclusions: 1. A radioactive gas or emanation can be obtained by drawing air over hot copper or by bubbling it thru hot or cold mercury. 2. By repeated circulation thru mercury very considerable activity can be obtained, activity of quite a different order from that of metals as ordinarily observed. 3. The mercury emanation deposits radioactive matter on the walls of the vessel containing it. This deposit remains after blowing out the gas, and possesses at first perhaps one-sixth of the activity of the latter. This induced activity falls to half its value in twenty minutes. 4. The emanation itself decays in activity according to an exponential law, falling to half value in 3.18 days of twenty-four hours each.—*Phil. Mag.*, July.

A Remarkable Phenomenon with Radium.

Prof. Dorn opened a glass tube into which about thirty milligrams of the strongest radium bromid had been introduced six months before, and which had then been closed by fusion. At the instant when the three-cornered file had hardly scratched the surface of the glass, the glass was pierced by an electric spark with audible noise. The spark was distinctly visible, altho the occurrence took place near the window on a bright afternoon. The author thinks that the negative electrons have passed thru the glass wall and gone off, while the positive ones remained in the interior of the tube. On the outer wall of the tube there has been positive electricity accumulated by surface conduction, or from the air, which was ionized thru the radiation of the radium. As the tube was held in the left hand and the metal of the file in the right, a discharge was possible, but it remains remarkable that the difference of potential could reach a value sufficient to pierce at least 0.2 millimeter of glass.—*Phys. Zeit.*, June 15.

Radio-Activity and the Age of the Sun.

Prof. G. H. Darwin suggests in *Nature* that previous estimates of the sun's age will have to be modified as the result of the discovery of a new source of energy in the disintegration of the atoms of radio-active substances. Lord Kelvin's well known estimate of 100,000,000 years was arrived at on the assumption that the energy emitted by the sun was derived from gravitation by the concentration of its mass. Prof. Darwin estimates that the energy derivable from this source is 2.7×10^7 m calories. If the sun were made of a radio-active material of the same strength as radium, it would be capable of emitting 10^9 m calories without reference to gravitation. This energy is nearly forty times as much as the gravitational energy. He sees no reason for doubting the possibility of augmenting the estimate of solar heat as derived from the theory of gravitation by some such factor as ten or twenty. The geologist's estimate of the age of the earth has always been so much greater than that of the physicist, that they have generally been looked upon as irreconcilable. The multiplication of the physical estimate by twenty would bring it into very close agreement with the geological estimate. The presence of helium in the sun points to the existence of radium in its mass, so that there is much to be said in favor of Prof. Darwin's hypothesis.—*London Electrical Review*, October 2, 1903.

Role of the Earth in Wireless Telegraphy.

Koepel (*Dingler's Polytechnical Journal*, June 20, 1903) investigates mathematically the relation which is borne by the electro-static capacity of the earth to the electric oscillations used in wireless telegraphy. The electro-static capacity of the earth is only about seven hundred micro-farads. The resonance in an oscillating circuit depends upon the product of the capacity and self induction of each resonance wire.

A piece cut off from one of these wires can be replaced by a globe of certain capacity, and the greater the wave length the greater will be the radius of the globe which replaces a certain part of the wire. By increasing the wave length a globe as large as the earth may be required to complete the resonance of one of the wires. He finds that with a wave length of 10,000 meters an oscillator, at one side of which a resonance wire of 2,500 meters length is carried vertically upward, and other side of which is earthed thru a wire of 100 cm. self induction, is electrically balanced. The maximum current required for this would be fifteen am. In this way signals may be conveyed to any part of the earth's surface. Koepel thinks Marconi with his installation for ocean telegraphy may have obtained partial earth resonance.

Humidity and the Static Machine.

It is appreciated by all who employ the static machine that during periods of humidity the machine either generates no current or the current which is generated is available to a degree relative to the humidity. This applies to all sorts of static machines, and especially to those which are most used, on acount of the constant discharges of ozone, nitrous acid, and water within the case. The problem to solve has been how to promote the absorption of the deleterious products of the electrical discharges and at the same time get rid of the moisture which is certain to creep into the case during periods when the air is saturated with moisture.

No agent so well meets these requirements as the commercial quicklime. It should be placed in a wooden box having lath sides placed one-quarter of an inch apart, and covered on all sides with two thicknesses of good muslin. From twenty to forty pounds of fresh hard lime should be put in this box at least once monthly during the summer. This will absorb much of the noxious gases as well as the water, and the machines which were in fair condition when the lime was put in the case will rarely discharge when used daily. Chlorid of calcium, which is in such common use, is positively deleterious in the long run to the interior of the machine. The only condition to be obviated in the use of lime is the dust which will settle upon all parts of the machine if not tightly closed in with muslin, as suggested. —*Journal Adv. Therapeutics.*

Radium at the British Association.

An interesting discussion on radium at the British Association developed into an attempt to determine whether radio-active substances derive their energy from an external source or from the liberation of energy stored up in the atom. In a paper contributed by Lord Kelvin the former view was upheld. Radium was compared to a piece of black cloth enclosed in a glass tube immersed in water and exposed to sunlight. Such a piece of cloth would absorb more heat from the sun's rays than a piece of white cloth in the same position, and would therefore maintain the surrounding water at a slightly higher temperature in the former case than in the latter. The form in which the eternal energy reached the radium was not specified, but he suggested that interesting results might be obtained by surrounding

the radium by different kinds of screens, and determining whether the amount of the radiation was thereby affected. Prof. Dewar explained an experiment which he had carried out for M. Curie, and which appeared to correspond with that suggested by Lord Kelvin. Liquid hydrogen was placed in a bottle with double sides coated with silver or mercury, and enclosing a vacuum, an arrangement which has been shown to be a practically perfect screen for preventing the passage of heat either by conduction or radiation. To still further increase the insulating properties of this bottle it was immersed in liquid air. Under ordinary conditions there was no evolution of hydrogen gas from the liquid in the bottle, but when a particle of radium was dropped into the liquid there was a continuous evolution of hydrogen gas. This gas when collected and measured gave a measure of the radio-active energy of the radium. The energy emitted by the radium appeared to be rather greater at the temperature of liquid hydrogen than at higher temperatures.

These experiments of Prof. Dewar give great support to the theory of Rutherford and Soddy, that the energy of radium is derived from energy stored up in the atom. Sir Oliver Lodge gave a provisional support to this theory, and pointed out that the instability of the atom had already been foreshadowed in the theoretical work of Larmor, who had shown that atoms ought to be unstable because they were continually radiating energy into space. Prof. Schuster said he always looked with suspicion on statements as to the theoretical foreshadowing of novel experimental discoveries. In his opinion, the complicated phenomena observed by Rutherford and Soddy had not yet been accounted for by any theoretical system of electrical attractions and repulsions.

Prof. Schuster considered that all substances were probably radio-active to an extent which, tho not measurable on small masses, might be very considerable on large aggregates. The known radio-active bodies would in that case be distinguished from other bodies—like iron in the case of magnetism—by the enormously exaggerated form in which they possessed the property. The earth was charged with negative electricity. But this charge must be continually leaking away, for Elster and Geitel had recently shown that the normal conductivity of the air was such that a body lost 1½ per cent. of its charge per minute. If the air in the immediate neighborhood of the ground had this conductivity, the earth would lose half its charge in about an hour. The discharge of this large amount of negative electricity through the atmosphere pointed to the existence of radio-active substances on the earth's surface. The radio-activity of the air arising out of the ground, or of water drawn out of wells, might be due to emanations produced by the terrestial radiation of electrons.

Prof. Lamar stated that most physicists were agreed in seeing an explanation of radio-active phenomena in an electric theory. The divergence arose on questions of detail. Everything depended on the dimensions and configurations of the electrons. Hitherto they had been looked upon as points, but if they were of definite size they were capable of explaining all the properties of the molecule. The experiments of Prof. Dewar had shown that radium could excite, in surrounding nitrogen, a bright line spectrum. This pointed to violent chemical disruption of a much more severe character than the collisions assumed in the kinetic theory of gases. He favored Prof. Rutherford's theory as to the origin of the kinetic energy of radium, etc., his supposition being that it existed within the atom in the form of rotational motion.—*London Electrical Review.*

The Failure of Medical Colleges to Give Advanced Therapeutic Measures a Dignified place in Their Curriculum.

The continued failure of the great medical colleges of the country to recognize in their courses of study measures which have already proved themselves invaluable in the treatment of diseased conditions call, at this season of the year, for more than passing notice.

That these measures are justly termed *advanced therapeutic* measures is evidenced from the fact that the members of the profession who are above prejudice, and are broad-minded enough to investigate them, are employing them today. This is not stated in a spirit of censure, but of fairness, with an earnest hope that, instead of inciting prejudice, it may attract the attention of those who fail to recognize their value and at the same time call attention to a continued failure to adopt them in the regular medical teaching.

With those who, from long experience, are familiar with the shortcomings of exclusive and generally empirical drug medication, there is always a growing disposition to diminish the number of drugs prescribed, and a tendency with conscientious physicians, who observe and study results, to give less and less of medical treatment. The members of the profession who employ in their later years, with the enthusiasm of their youth, the extensive list of remedies now accorded a place in the pharmacopœia, are those who fail to realize how valueless the majority of such remedies are. Furthermore, the disposition of the leading medical minds to make little use of the bulk of such remedies, and their inclination to rely less on medical measures, in the fullness of their experience, is sufficient argument that that sacred volume be renovated, and the useless drugs be stricken out, or at least relegated to their proper place.

How wrong it is to educate the rising physician to believe that which in later years and experience he is certain to abandon! Failure to succeed in cases that, from their nature, should be cured with the measures taught in their college course, leads the mature physician to look out for more scientific and rational means than empirical drug medication with which to cure his patients.

Such physicians and surgeons are led either to adopt surgical measures which, on account of their certainty of action, are more positive in their results, or physical agents which may be studied in their effects from a more rational standpoint. When the medical man, however, comes to investigate the employment of electricity, hydrotherapy, dry hot air, light, mechanical vibration, or the Roentgen ray, he requires a technical knowledge of the application of these agencies in order to obtain the most satisfactory results from their employment. We find many leading minds in the profession seeking with eagerness information in these departments of medical science. It is not the pharmacopile or the *hit-or-miss* doctor who fails to discern the inefficiency of the ancient measures that seeks this information, but the progressive, up-to-date physician. The earnestness and eagerness with which he takes up and uses the measures above referred to, and the success which follows the introduction into his armamentarium of the means, are a guarantee of the certainty of their action.

We repeat again, *"opposition is the sign of ignorance."* The man or teacher who opposes or stands in the way of the introduction of these measures into general use by the medical profession does so because he is unwilling to take the time to investigate it himself, and wishing, at the same time, to be considered in the van, would stigmatize the methods and cloak his own ignorance. False teaching or hypocrisy in matters affecting public health and the

welfare of the community are inexcusable in an enlightened age, and deplorable when involving a learned profesion.

The employment of electricity in therapeutics has grown apace with the better knowledge of the physical properties of the agent. When we look about us and see the growth and employment of this form of energy in the commercial pursuits, and recall its use half a century ago, the progress is amazing. When we say that the employment of this same agent in therapeutics has advanced, in the hands of those who are familiar with it, to an equal extent, our veracity is questioned, and yet, *it is the truth.* In the treatment of nervous diseases, electricity has made strides still unrecognized by many who are looked upon as and consider themselves authorities. The success attending the treatment of neuritis, tabes, and anterior poliomyelitis in its early stages, when scientifically managed, are examples of the wonderful efficacy of the high potential currents. Local stasis, hyperemia, congestion, and pain of acute and chronic inflammatory conditions are relieved by electricity, where the remedies of the pharmacopile have proved absolutely useless. Functional neuroses and debilitated states receive an impetus from the intelligent employment of this energizing force where drugs have absolutely failed.

The employment of electrolysis by the methods of Newman, Massey, Gautier and others has wrought successful results where surgical interference would have been recognized as a therapeutic measure.

Hydrotherapy has been recognized as a therapeutic measure since the earliest times, and yet few physicians today have a fair conception of its indications and the technique of its employment. In what medical college has hydrotherapy been recognized? Probably no agency will, to the same extent, increase the physical resistance of the patient against climatic influences, and at the same time stimulate a healthy metabolism, as the scientific employment of water, one of the most common means at the command of physician and patient. The physician should ever be trained to intelligently advise his patient in the employment of hot and cold water baths, douches, wet packs, shower baths, sitz baths, and every other use of this valuable therapeutic agent.

The valus of dry hot air, or heat generally, in the treatment of disease has been acknowledged since early times, and yet what school teaches the method of employment in a thoroughly technical manner. The Turkish bath has been employed generally under the supervision of laymen often unscientifically, and always fraught with elements of danger and discomfort. The body hot air treatment in skilled hands should supplant the Turkish bath, especially in the treatment of rheumatic and gouty affections. The use of dry hot air in a properly constructed body apparatus, with the head of the patient not exposed to the heat, permits the employment of temperatures which promote profuse diaphoresis and active elimination to an extent not approached by the Turkish bath. This treatment, however, is not complete except when systematically employed in conjunction with hydrotherapy.

Mechanical vibration, employed in the form of massage, and under the title of osteopathy by a cult who have sought to make out of the employment of one measure a cure-all; performed manually in the past, has received a great impetus during recent years from the adoption of properly constructed apparatus. The great value of mechanical vibration as a therapeutic measure has been demonstrated clinically. It is applicable to inflammatory conditions, removing local stasis, infiltration and congestions, stimulating nu-

trition, and improving local metabolism and secretion to a large degree which was not possible to accomplish with manual methods. Few medical schools in the country have given it a place in their curriculum.

The latest of the physical measures to receive recognition, and apparently the ones accorded a fairer treatment than those above referred to are *light*, and the *Roentgen ray*. The rays of different degrees of refraction having been accorded special recognition already, owing to the labors of many advanced workers, receiving attention from all schools of medicine, but few, we believe, have added anything more than a passing consideration in the curriculum of the teaching of the medical colleges. It is probable that if the suggestions of many of the older masters regarding the value of light as a therapeutic agent had been more generally recognized and employed, its adoption now would not be ranked as an advance in therapeutics.

The subject of *dietetics* has received indifferent consideration for years in the medical schools. Too few physicians today, from the medical training in their *alma mater*, are able intelligently to prescribe the diet indicated in the various conditions for which they are called upon to prescribe. If the same attention were given this all-important subject that is accorded the remedies of the pharmacopeia in the treatment of disease, there would be less call for the use of such remedies.

Physical therapeutic exercise, invaluable for the correction and prevention of deformities, for the induction of normal healthy metabolism, and the restoration to health of the indolent and inactive, is a subject which calls for most thorough attention in the medical colleges at this time, and what chair in the medical schools of the country devotes attention to this most valuable method of treatment? The ancient Greeks and Romans recognized its value, and the laymen today have adopted its use, in defiance, as it were, of a slow profession. The tendency, without medical advice, to a better observance of the laws of health, physical exercise, and diet, is a well-merited reproach upon the intelligence and progress of the learned.

Already we hear much of *suggestion*, and much for and against hypnotism in the medical press, but what medical school in the country today is giving a scientific course in *psychiatry?* That it is important that such instruction should be given there is little doubt, when all medical men recognize the value of suggestion, and employ placeboes in treatment of disease. Placeboes are dishonest. The rational intelligent employment of a cultivated personality in the physician, and its exercise for the benefit and well-being of the patient, in connection with the employment of physical agents, which act as a *vis a tergo*, will supplant in the future the placebo of the pharmacopile.—*Editorial, Jour. Adv. Ther.*, October, 1903.

Production of Helium from Radium.—Ramsay and Soddy presented a paper before the Royal Society, England. The authors conveyed the maximum amount of the emanation obtained from 50 mgms. of radium bromid by means of oxygen into a U tube cooled in liquid air, and the latter was then extracted by the pump. It was then washed out with a little fresh oxygen, which was again pumped off. The vacuum tube sealed onto the U tube, after removing the liquid air, showed no trace of helium. After standing for four days the helium spectrum appeared and the characteristic lines were observed identical in position with those of a helium tube thrown into the field of vision at the same time.—*El. World and Eng.*

Action of the Earth in the Propagation of Electric Waves.—Voller gives the result of experiments with a small Braun and Siemens-Halske apparatus, which was operated in four ways: 1, in the ordinary manner, with both air wires, without any earth connection; 2, without both air wires and with connecting wires to earth plates; 3, with replacement of sender or receiver wire respectively by earth connection; 4, without air wires or earth connections. He concludes that a variable electrification, communicated to the surface of the earth, is propagated by conduction in the latter in the same way as in a dielectric by progressive polarization, and that, therefore, a sort of wave telegraphy through the surface of the earth is possible.—*Phys. Zeit.*, October 1.

Method of Showing Penetrating Powers of Radium Rays.—Black describes a simple method for showing the great penetrating powers of certain radium rays. His arrangement consisted of two large Leyden jars, which had their interior coating joined to the two sides of a Wimshurst machine, while their exterior coatings were joined to two small exactly similar spark-gaps arranged in parallel, to form alternative paths for the secondary discharge when the primary discharge took place on the machine. The secondary discharge will then pass at the gap which is exposed to the radioactive substance. The author has shown by this arrangement that 1 cgm. of radium bromid sends some rays thru 8.5 cm. of lead. The presence of 1 cgm. of radium bromid, even at a distance of two meters, may be detected definitely. To obtain these results the terminals at the spark-gaps ought to be small spheres about 1 to 2 cm. diameter, the gaps should be small and carefully shielded from all discharge of the machine. Thick lead shields, about 25 cm. thick, should be arranged to hinder any action of the radium on the gap which is not exposed to the radiation, and the Leyden jars should be of considerable capacity. He gives a table containing the results of some experiments, and shows that the radioactivity, induced by radium, produces some penetrating rays. After the radium bromid had been in the ebonite box for eighteen hours, when the empty box was put on a sheet of zinc 0.5 mm. thick, which was placed over one of the gaps, the sparks passed readily thru that gap.—*Lond. Elec.*, August 21.

Radioactivity of Metals in General.—Voller discusses the results obtained by McLennan and Burton. These experiments found that metals like lead, aluminum, zinc, tin and copper send out spontaneously positive ions and retain, therefore, negative charges. They found negative potentials of 0.216 to 0.073 volts. The author calls attention to the fact that in electro-meter measurements of such potentials, which are of the order of the Volta contact potentials, it is necessary to consider all electro-motive forces which appear between the single metallic parts of the electrometer or the whole electrometer system, when they touch each other. In such cases the metals to be investigated and the metals of which the electrometer is composed have to be of the same nature. If, however, the electrometer quadrants were of brass there was always the voltaic electromotive force of brass against lead, aluminum, etc., acting in the system. These forces generate potentials, the value of which is equal to or greater than those measured by the first-named experimenters. If the above influence of the voltaic potentials has not been excluded, there is no necessity to assume a general and spontaneous electronic emanation of all metallic surfaces.—*Phys. Zeit.*, October 1.

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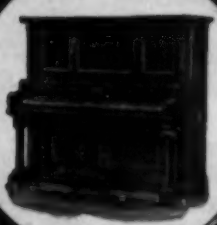

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